REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

By the foregoing amendment, claims 1-6, 13-15, and 18 have been amended, claims 11-12 and 17 have been canceled, and new claims 19-41 have been added. No new matter has been added. The amendments are fully supported by at least Figures 3, 10, 18, 22, 24- 27, 29, and 34, the corresponding description in the specification; page 30, lines 20-25; page 31, lines 1-4; page 35, lines 17-21; page 37, lines 6-25; and page 38, lines 3-11; as originally filed. Claim 10 was previously canceled. Thus, claims 1-9, 13-16, and 18-41 are currently pending in the application and subject to examination.

Rejection Under 35 U.S.C. § 103

In the outstanding Office Action claims 1-9, 11-17 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Manwaring, U.S. Publication No. 2002/0098897 in view of Numazaki et al., U.S. Patent No. 6,144,366 and Poillon et al., U.S. Patent No. 5,056,791. It is noted that claims 1-6, 13-15, and 18 have been amended, and claims 11-12 and 17 have been canceled. To the extent that the rejection remains applicable to the claims currently pending, the Applicants hereby traverse the rejection as follows.

Applicants' invention as now set forth in claim 1 is directed to an information processing apparatus provided with an input system utilizing a stroboscope, comprising:

> a stroboscope including a light source outputting a light of a specific wavelength range;
> a base unit which includes a supporting cylinder having an opening

and a lens provided below said opening in said supporting cylinder;

a filter provided so as to cover said opening of said supporting cylinder and passing only the light of said specific wavelength range;

a first object including a first retroreflective body; said light source being provided in the vicinity of said filter so as to light up said first object;

an imager, which is provided within said base unit and below said lens, imaging said first object at a light-emission and at a non-light-emission of said stroboscope to produce a plurality of image signals at light-emission and a plurality of image signals at non-light emission;

a calculator calculating a part or all of information of a position, a size, a velocity, an acceleration, a moving path pattern of said first object by detecting a first notable portion in correspondence to said first retroreflective body from difference between said image signals at light-emission and said image signals at non-light emission; and

an information processor performing information processing according to an application on the basis of the information calculated based on said difference by said calculator to provide an output according to said application.

Manwaring discloses flash units 42a-b and 46a-b and cameras 26, 28 for calculating the velocity of a golf ball. See Fig. 1. However, Manwaring does not disclose or suggest a stroboscope including a light source outputting a light of a specific wavelength range, a unit base including a supporting cylinder having an opening and a lens provided below the opening, a wavelength filter covering the opening, an imager within the base unit and below the lens, as recited in amended claim 1. Figure 1 of Manwaring illustrates that the flash units and cameras are separate from each other and set on a tilting arm. There is no base unit having a supporting cylinder housing a lens and imager beneath an opening covered with a wavelength filter.

Numazaki teaches a lighting unit 101 passing infrared light and an optical filter 1202. However, Numazaki does not disclose or suggest the recited structure. Furthermore, the optical filter 1202 in Numazaki filters infrared light emitted from the lighting unit. See column 59, lines 44-46. Thus, Numazaki does not disclose the

structure recited in claim 1, wherein the filter covers an opening in a cylinder of a base unit having a lens and imager provided below the opening. Furthermore, in Numazaki, the filter blocks infrared light emitted by the light source, whereas in claim 1, the light source outputs a specific wavelength and the filter passes "only the light of said specific wavelength."

Furthermore, neither Manwaring nor Numazaki disclose or suggest the above features in combination wherein the imager images the object during light emission and non-light emission of the stroboscope to produce a plurality of image signals at light emission and a plurality of signals at non-light emission, a calculator calculating a part or all of information of a position, a size, a velocity, an acceleration, a moving path pattern of the object by detecting a first notable portion in correspondence to the first retroreflective body from a difference between the image signals at light-emission and the image signals at non-light emission, and an information processor performing information processing according to an application on the basis of the information calculated based on the difference by the calculator to provide an output according to the application, as recited in amended claim 1.

For at least this combination of reasons, the Applicants submit that claim 1 is allowable over the cited art.

As claim 1 is allowable, the Applicants submit that claims 2-9, 13-16, and newly added claims 19-41, which depend either directly or indirectly from allowable claim 1, are therefore also allowable for at least the above noted reasons and for the additional subject matter recited therein.

For example, the cited art further fails to disclose or suggest the transmission of the information regarding the object only if it is determined that the predetermined condition is met, as in amended claim 3.

The cited art further fails to disclose or suggest a distance calculator calculating a distance between the object and the imager on the basis of the first notable portion that is an image of the first object captured in the differential image, as in amended claim 4.

The cited art further fails to disclose or suggest a first angle calculator calculating a first angle indicative of an inclination of the shape corresponding to the first object, as in amended claim 5.

Independent claim 18 is directed to a storage medium storing a program for an information processing apparatus provided with an input system utilizing

a stroboscope which includes a light source outputting a light of a specific wavelength, a base unit which includes a supporting cylinder having an opening and a lens provided below said opening in said supporting cylinder; a filter provided so as to cover said opening of said supporting cylinder and passing only the light of said specific wavelength range; a first object including a first retroreflective body, wherein the light source is provided in the vicinity of said filter so as to light up said first object; and an imager which images the light passing through said filter, said program causing a processor of said information processing apparatus to execute:

an imaging step of imaging by said imager said first object at a light-emission and at a non-light-emission of said stroboscope to produce a plurality of image signals at light-emission and a plurality of image signals at non-light emission;

a first step of calculating a part or all of information of a position, a size, a velocity, an acceleration, a moving path pattern of said first object by detecting a first notable portion in correspondence to said first retroreflective body from difference between said image signal at light-emission and said image signal at non-light emission; and

a second step of performing information processing according to an application on the basis of the information calculated based on said difference by said first step to provide an output according to said application.

Thus, for reasons similar to those discussed above for claim 1, the Applicants submit that claim 18 is likewise allowable over the cited art.

New Claims 19-41

As noted above, claims 19-41 depend either directly or indirectly from allowable claim 1. As claim 1 is allowable, the Applicants submit that claims 19-41 are therefore also allowable for at least their dependence from an allowable claim and further for the subject matter recited therein.

For example, the cited art fails to disclose or suggest a moving object controller controlling a movement of a moving object displayed on a screen based on the information calculated based on the difference by the calculator, as in claim 19. Manwaring analyzes a swing and a realtistic ball orbit, but does not disclose or suggest displaying the movement of an object on a screen. Numazaki extracts a finger on a hand by calculating a differential portion and then calculates a point of gravity of the finger to display a cursor on it. However, it is impossible to apply the cursor control of Numazaki to the swing analysis of Manwaring. There is no suggestion disclosed or suggested that would move a cursor according to the swing in Manwaring.

Furthermore, Numazaki uses a hand of a human being controlling the cursor image rather than an input device of an object including a retroreflective body, as in claim 19.

Poillon analyzes the swing of a golf club and based on the analysis calculates an orbit of a ball on a screen. However, Poillon uses a sound wave detector, or an acoustic detector, to detect the swing. In contrast, in claim 19, movement of the object is detected based on differential images by an imager in order to control an image on a

screen. Manwaring, Numazaki, and Poillon cannot be combined to disclose the recited apparatus because they teach divergent detecting methods. It is improper to propose a modification to a reference that would change a principle of operation of the reference. See MPEP § 2143.01.

As another example, the cited art fails to disclose or suggest a movable body rotatable in at least one of an elevation direction and a revolution direction, the imager, base unit, and light source being accommodated in the movable body, as in claim 20.

The cited art fails to disclose or suggest a transparent or semitransparent housing accommodating the first retroreflective body, as in claim 21.

The cited art fails to disclose or suggest the first object being provided with a strap, being attached to a lower leg or an ankle of a player, being in the form of a band, or being in the form of a glove, as in claims 22-25, respectively.

The cited art fails to disclose or suggest a retroreflective body having a long, thin shape, the calculator detecting said first notable portion from said difference and calculating at least one of an angle, position, moving speed and moving path pattern of said first object, and said information processor performing a sword battle game on the basis of said at least one of the angle, position, moving speed and moving path pattern of said first object calculated by said calculator, as in claim 26.

The cited art fails to disclose or suggest a second object including a second retroreflective body, wherein said imager images said second object at a light-emission and at a non-light-emission of said stroboscope to produce a plurality of image signals at light-emission and a plurality of image signals at non-light emission; said calculator calculates a part or all of information of a position, a size, a velocity, an acceleration, a

moving path pattern of said second object by detecting a second notable portion in correspondence to said second retroreflective body from difference between said image signal at light-emission and said image signal at non-light emission; and said information processor performs information processing according to an application on the basis of the information of the first object and the second object calculated based on said difference by said calculator to provide an output according to said application, as in claim 27.

The cited art fails to disclose or suggest a first object being attached to a hand or wrist, or held by a hand of a player, and said second object being attached to a lower leg or ankle of said player, as in claim 28.

The cited art fails to disclose or suggest a moving object controller that controls a movement of said moving object of said screen on the basis of the position of said first object calculated by said calculator or that calculates an initial speed of said moving object on said screen on the basis of the speed of said first object calculated by said calculator, as in claims 29 and 30.

The cited art fails to disclose or suggest an information processor that includes a determiner determining whether said moving object on said screen collides with a predetermined image on said screen, as in claim 31.

The cited art fails to disclose or suggest a determiner that determines whether said first object was swung on the basis of the speed of said first object, as in claim 32.

The cited art fails to disclose or suggest a determiner that determines that said first object was swung when the speed of said first object becomes equal to or larger a predetermined value in a plurality of succeeding times, as in claim 33.

The cited art fails to disclose or suggest a moving object controller that calculates an initial speed of said moving object on said screen on the basis of the speed of said first object calculated by said calculator if and when said determiner determines that said first object was swung, as in claim 34.

The cited art fails to disclose or suggest a moving object on said screen that is an image of a ball for a bowling game and said predetermined image on said screen is an image of a pin for the bowling game, as in claim 35.

The cited art fails to disclose or suggest an application for a soccer game, dance game, bowling game, baseball game, table tennis game, tennis game, soccer game, boxing game, dance game and sword battle game, as in claims 36-38.

The cited art fails to disclose or suggest moving object on said screen being an image of a ball for golf game, as in claim 39.

The cited art fails to disclose or suggest a calculator that includes a swing direction calculator calculating a swing direction of said first object on the basis of a movement of said first notable portion, and a second angle calculator calculating a second angle indicative of an inclination of said first object with respect to said swing direction on the basis of said swing direction calculated by said swing direction calculator and said first angle calculated by said first angle calculator, as in claim 40.

The cited art fails to disclose or suggest a information processor that includes a parameter calculator calculating a parameter of a hook/slice in hitting a ball on the basis of said second angle, as in claim 41.

Conclusion

For all of the above reasons, it is respectfully submitted that claims 1-6, 13-15 and 19-41 are in condition for allowance and a Notice of Allowability is earnestly solicited.

Should the Examiner determine that any further action is necessary to place this application into better form, the Examiner is invited to contact the undersigned representative at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants hereby petition for an appropriate extension of time. The Commissioner is hereby authorized to charge any fee deficiency or credit any overpayment associated with this communication to Deposit Account No. 01-2300 referencing client matter number **100341-00057**.

Respectfully submitted,

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